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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,043	03/08/2005	Raj G. Rajendran	CL2000USPCT	6819

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EXAMINER	
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ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/527,043	RAJENDRAN, RAJ G.	
	Examiner	Art Unit	
	Edu E. Enin-Okut	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 October 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) *1-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

MEMBRANES FOR FUEL CELLS

Detailed Action

1. The Applicant's amendment filed on October 14, 2008 was received. Claims 1-17 were cancelled. Claims 18-34 were added.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in the prior Office action issued on July 11, 2008.

Claim Objections

3. The objections to claims 10 and 11 are withdrawn because claims 10-11 have been cancelled.

Claim Rejections - 35 USC § 103

4. The rejection of claims 1-17 under 35 U.S.C. 103(a) as being unpatentable over Banerjee et al. are withdrawn because claims 1-17 have been cancelled.

5. Claims 18-34 are rejected under 35 U.S.C. 103(a) as being obvious over Banerjee et al. (US 5,672,438).

Regarding claim 18, Banerjee teaches a method of increasing the power in a direct methanol fuel cell (Abstract; 2:62-3:4) comprising:

(i) providing (a) a solid fluorinated polymer electrolyte membrane [26], wherein the solid polymer electrolyte membrane has a first surface and a second surface (2:62-3:5; Fig. 3; claim 15-16); and, (b) at least one catalyst layer present on each of the first and second surfaces of the solid polymer electrolyte membrane [22, 30] (6:64-7:3); and

(ii) operating the direct methanol fuel cell at a temperature of less than 60 °C (10:18-52; Fig. 5).

Banerjee does not expressly teaches that the solid fluorinated polymer electrolyte membrane having an ion exchange ratio (IXR) of at least about 17; or, methanol cross-over rate is reduced by at least about 20 %; or, the power output is increased up to about 15% as compared to a fuel cell comprising a solid fluorinated polymer electrolyte membrane having an ion exchange ratio (IXR) of about 15 and the same thickness as the solid fluorinated polymer electrolyte membrane in (a)

As to solid fluorinated polymer electrolyte membrane [26] having an ion exchange ratio (IXR) of at least about 17, Banerjee does teach that cation exchange membrane 26 has an IXR of at least about 23 (2:62-3:5; claim 1).

Since it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art (e.g., *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)), it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a solid fluorinated polymer electrolyte membrane having an IXR of at least about 17 into the direct oxide fuel cell of Banerjee as recited in this claim. See MPEP 2144.05 (I).

As to the methanol cross-over rate being reduced by at least about 20%; and, the power output being equal to or increased up to about 15% as compared to a fuel cell comprising a solid fluorinated polymer electrolyte membrane having an ion exchange ratio (IXR) of about 15 and the same thickness, the courts have held that the mere recognition of latent properties, like the reduction of the methanol cross-over rate or an increase in power output of a direct methanol fuel cell, in the prior art such as that taught by Banerjee, does not render non-obvious an otherwise known invention (e.g., *In re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979)). The courts have also held that "[t]he fact that appellant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious." *Ex Parte Obiaya*, 227 USPQ 58, 60 (BPAI 1985).

Regarding claims 19 and 20, Banerjee teaches that the IXR is 23 to 29 (2:65-3:5; 4:62-66; claims 1-2).

Banerjee does not expressly teach that the IXR is from 17 to 29, or from 19 to 23, as recited in claims 2 and 3, respectively.

However, since it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art (e.g., *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)), it would have been obvious to one of ordinary skill in the art to use a solid polymer electrolyte membrane in the direct oxide fuel cell of Banerjee with an IXR in ranges as recited by claims 2-3. See MPEP 2144.05 (I).

Regarding claim 21, Banerjee teaches that the IXR is 23 (2:65-3:5; claim 1).

Regarding claims 22-24, Banerjee teaches operation of the direct methanol fuel cell at temperatures from about 40 °C to about 80 °C, as shown in Fig. 5. As sated above, it has been held that obviousness exists where the claimed ranges overlap or lie inside ranges disclosed by the prior art. See MPEP 2144.05 (I).

Regarding claims 25-26, Banerjee does not expressly teach that the power output is increased by 5 to 15%, or by 10 to 15%.

However, as discussed above, it has been held that the mere recognition of latent properties, like an increase in power output of a direct methanol fuel cell, in the prior art such as that taught by Banerjee, does not render non-obvious an otherwise known invention (e.g., *In re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979)).

Regarding claims 27 and 28, Banerjee teaches the thickness of the membrane, having an IXR of 23 (2:62-3:5), can be varied as desired for a particular electrochemical cell application (5:54-55). Typically, the thickness of the membrane is generally less than about 250 μm (5:55-57). Further, it has been held that obviousness exists where the claimed ranges and prior art ranges do not overlap but are

close enough that one skilled in the art would have expected them to have the same properties (e.g., *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ773 (Fed. Cir. 1985)). See MPEP 2144.05.

As to methanol cross-over rate being reduced by 60% or 75%, the courts have held that the mere recognition of latent properties, like the reduction of the methanol cross-over rate of a direct methanol fuel cell, in the prior art such as that taught by Banerjee, does not render non-obvious an otherwise known invention (e.g., *In re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979)).

Regarding claim 29, Banerjee teaches that the solid fluorinated polymer electrolyte membrane is a perfluorinated polymer (4:9-22).

Regarding claims 30 and 31, Banerjee teaches that the perfluorinated polymer comprises a carbon backbone and at least one side chain represented by the formula --$(OCF_2CFR_f)_a$--$OCF_2CFR'_fSO_3Y$, wherein R_f and R'_f are independently selected from F, Cl or a perfluorinated alkyl group having 1 to 10 carbon atoms, a = 0, 1 or 2, and Y is H, an alkali metal, or NH_4 (4:34-41; claim 5).

Regarding claims 32-34, the limitation recited in this claim has been addressed above with respect to claims 19-21, respectively.

Response to Arguments

6. Applicant's arguments with respect to claims 18-34 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence / Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Edu E. Enin-Okut** whose telephone number is **571-270-3075**. The examiner can normally be reached on Monday - Thursday, 7 a.m. - 3 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on 571-272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edu E Enin-Okut/
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795